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09/486,779	03/02/2000	ALEX Q. HUANG	01640052AA	2967

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EXAMINER

LOKE, STEVEN HO YIN

ART UNIT	PAPER NUMBER
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2811

DATE MAILED: 04/10/2002

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/486,779

Applicant(s)

HUANG, ALEX Q.

Examiner

Steven Loke

Art Unit

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 23 January 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-38 is/are pending in the application.
- 4a) Of the above claim(s) 10-18 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 8 and 19-38 is/are rejected.
- 7) ☒ Claim(s) 7 and 9 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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1. Claims 10-18 are withdrawn from further consideration pursuant to 37 CFR 1.142(b), as being drawn to a nonelected species, there being no allowable generic or linking claim. Applicant timely traversed the restriction (election) requirement in Paper No. 5.
2. Applicant's election with traverse of claims 23-32 in Paper No. 5 is acknowledged. The traversal is on the ground(s) that the Examiner is incorrect in asserting that the identified species are not disclosed as related in such a way as to form a single inventive concept. This is not found persuasive because each species is directed to a different way to control a thyristor. Species I, V and VI are using two MOSFETs to control a thyristor. Species II is using a single discrete MOSFET to control a gate turn-off (GTO) thyristor. Species III is using two discrete MOSFETs and a charge storage device to control a GTO thyristor. Species IV is using a single discrete MOSFET to control a GTO thyristor. Each of the above groups of species is using a different way to control a thyristor. The species I-VI are not related to a single inventive concept and they demonstrate the existence of a serious burden of examination. Since species I, V and VI are directed to a thyristor controlled by two MOSFETs, the examiner will examine species I, V and VI.

The requirement is still deemed proper and is therefore made FINAL.

3. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.
4. The disclosure is objected to because of the following informalities:

There is no Q<sub>E</sub> (page 5, line 8) in fig. 18.

OK

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OK There is no  $Q_E$  and  $Q_G$  (page 5, line 10) in fig. 19.

OK There is no reference numeral 22 (page 5, line 26) in fig. 1A.

There is no P base 74 (page 9, line 18) in fig. 3A.

OK There is no MOSFET 158 (page 15, line 19) in fig. 7A.

OK The NMOS 188 and the PMOS2 190 do not share the same gate 196 and the cathode contact 192 (page 17, lines 6-8).

OK There is no G1 and terminal B (page 21, line 15) in figs. 17A-17F.

OK There is no cathode terminal in fig. 17B.

OK There is no C 600 (page 22, line 8) in fig. 18.

Appropriate correction is required.

5. Claims 19-32 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

OK The specification never discloses a first MOS transistor having a second terminal connected to the third metal plate acting as a cathode as claimed in claim 19.

OK The specification never discloses a second MOS transistor having a second terminal and a gate terminal connected to the third metal plate as claimed in claim 19.

OK The specification never discloses a second terminal of the MOS transistors connected to a cathode terminal of the GTO device package and a second terminal of the MOS switching devices connected to the cathode terminal of the GTO device package as claimed in claim 23.

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The specification never discloses the MOS switching devices comprise a diode as claimed in claim 27.

The specification never discloses the MOS switching devices comprise a diode connected in parallel with a capacitor as claimed in claim 28.

The specification never discloses the MOS switching devices comprise a Zener diode connected in parallel with a capacitor as claimed in claim 29.

The specification never discloses the MOS switching devices comprises a transistor connected in parallel with a capacitor as claimed in claim 30.

The specification never discloses the claimed subject matters as claimed in claims 31 and 32.

6. Claims 33-38 are rejected under 35 U.S.C. 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

The specification never discloses a signal of a first type applied to control electrodes of the first and second electronic switches turn the emitter turn-off thyristor to an on-state and a signal of a second type applied to control electrodes of the first and second electronic switches turn the emitter turn-off thyristor to an off-state as claimed in claim 33.

7. Claims 19-22, 34 and 37 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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In claim 19, line 7, "said ETO devices package" has no antecedent basis.

In claim 34, line 2, "at leasat" is unclear whether it is being referred to "at least".

In claim 37, lines 2-3, "said first and second semiconductor devices" has no antecedent basis.

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in–

(1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effect under this subsection of a national application published under section 122(b) only if the international application designating the United States was published under Article 21(2)(a) of such treaty in the English language; or

(2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that a patent shall not be deemed filed in the United States for the purposes of this subsection based on the filing of an international application filed under the treaty defined in section 351(a).

9. Claims 1-6 and 8 are clear and definite and claims 33, 34 and 37 insofar, as in compliance with 35 USC 112, are rejected under 35 U.S.C. 102(e) as being clearly anticipated by Schlangenotto.

Schlangenotto shows all the elements of the claimed invention in figs. 1-3. It comprises: a p-type substrate [1]; a n-type base [2] and a p-type base [3] formed on the substrate; an n-type region [4] formed on the base [3]; p-type regions [5a, 5b] formed on the n-type region [4]; an insulated gate [G] of the MOSFET M1 (first MOS transistor) formed between the p-type regions [5a, 5b]; a cathode electrode [K] formed on the p-type region [5b] and connected to the insulated gate of the MOSFET M2 (second MOS transistor); a floating cathode metal [K'] formed on the p-type region [5a] and the n-type region [4]; a MOSFET M3 (third MOS transistor) formed on the regions [2, 3, 4]. A first

voltage applied to a gate terminal of the first MOS transistor causes a forward current to flow between the cathode terminal and the anode terminal turning the thyristor device to an on state, and a zero voltage applied to the gate of the first MOS transistor turns the thyristor device to an off state (col. 4, lines 42-55).

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 35, 36 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schlangenotto.

In regards to claim 35, it would have been obvious for the thyristor device and the first and second semiconductor switches are formed as discrete devices because it depends on the size of the overall device.

In regards to claim 36, it would have been obvious for the thyristor device and the first and second semiconductor switches are commonly packaged because it depends on the size of the overall device.

In regards to claim 38, it would have been obvious for at least one of the first and second semiconductor switches is constituted by a plurality of semiconductor devices because it depends on the amount of current flow into the thyristor.

12. Claims 7 and 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

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13. The following is a statement of reasons for the indication of allowable subject matter: The first major difference in the claims not found in the prior art of record is the first MOS transistor comprises an NMOS transistor, the second MOS transistor comprises a PMOS transistor, and the third MOS transistor comprises an NMOS transistor. The second major difference in the claims not found in the prior art of record is a diode connected between the gate of the first MOS and the thyristor emitter.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Steven Loke whose telephone number is (703) 308-4920. The examiner can normally be reached on 7:50 am to 5:20 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on (703) 308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7722 for regular communications and (703) 308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

sl  
April 7, 2002

Steven Loke  
Primary Examiner

